UNITED STATES PATENT AND TRADEMARK OFFICE

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PO BOX 3001
BRIARCLIFF MANOR, NY 10510-8001

EXAMINER
MITCHELL, JASON D

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

       1.☒ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *10/14/04*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

This action is in response to a preliminary amendment filed on 10/14/04.

Claims 1-23 are pending in this application.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-11 and 18-23 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 1 recites "A method for ... detecting ... providing ... ; and determining". this language fails to tie the claim to another statutory class (such as a particular apparatus) or transform underlying subject matter (such as an article or material) to a different state or thing. Accordingly the claim is rejected as directed to non-statutory subject matter.

Claims 2-11 do not correct this issue and are thus rejected accordingly.

Claim 18 fails to fall within a statutory category of invention. It is directed to a program itself (i.e. a compiler), not a process occurring as a result of executing the program, a machine programmed to operate in accordance with the program or a manufacture structurally and functionally interconnected with the program in a manner which enables the program to act as a computer component and realize its functionality. It's also clearly not directed to a composition of matter. Therefor it is rejected as being non-statutory under 35 USC 101.

Claims 19-23 depend from claim 18 and do not address this issue and are thus

also rejected as being non-statutory under 35 USC 101.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form

the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 7-14 and 16-22 are rejected under 35 U.S.C. 102(b) as being

anticipated by US 5,752,035 to Trimberger (Trimberger).

Regarding Claim 1, 12 and 18: Trimberger discloses a method for processing an

information based on a sequence of instructions, said method comprising the steps of:

a) detecting a repeated sub-sequence in said sequence of instructions (col. 14,

lines 65-67 identifies commonly used sequences of fixed instructions");

b) providing an index information indicating the repetition frequency of said

repeated sub-sequence (col. 15, lines 15-18 "measurements made of which instructions

or instruction sequences are most common"); and

c) determining an allocation between a processing resource and said repeated

sub-sequence based on said index information (col. 15, lines 19-23 "These most

commonly used sequences ... optimized to form a single RSIA instruction that performs

the whole task").

Regarding Claims 2, 17 and 19: The rejections of claims 1, 13 and 18 are incorporated

respectively; further Trimberger discloses generating an instruction containing said

index information, and adding said instruction to said sequence of instructions (col. 15,

lines 19-23 "form a single RSIA instruction that performs the whole task"; col. 15, lines

39-44 "least used RISA instructions are converted back into fixed instructions").

Regarding Claims 7 and 21: The rejections of claims 1 and 18 are incorporated

respectively; further Trimberger discloses generating an instruction for deleting said

repeated sub-sequence, if said repeated sub-sequence is no longer detected for a

predetermined time period, and resetting a processing unit to which said deleted

repeated sub-sequence was allocated (col. 15, lines 39-42 "instructions which are used

least often … are converted back into fixed instructions").

Regarding Claims 8 and 22: The rejections of claims 1 and 18 are incorporated

respectively; further Trimberger discloses generating an instruction for specifying

processing registers used by said repeated sub-sequence, and using said instruction for

locking said specified processing registers (col. 11, lines 1-4 "registers are … controlled

by the RISA FPGA 120 as necessary").

Regarding Claim 9: The rejection of claim 2 is incorporated; further Trimberger

discloses activating a processing resource (20-2n) when said instruction containing said

index information indicates that the corresponding repeated sub-sequence has already

been allocated to said processing resource (col. 7, line 66-col. 8, line 3 "The

configuration store 31 may [be] accessible ... for dynamically reprogramming in a field

programmable gate array 30").

Regarding Claim 10: The rejection of claim 9 is incorporated; further Trimberger

discloses said activating step comprises the step of programming said processing

resource according to said corresponding repeated sub-sequence, or uploading said

corresponding repeated sub-sequence to a memory of said processing resource (col. 7,

line 66-col. 8, line 3 "The configuration store 31 may [be] accessible ... for dynamically

reprogramming in a field programmable gate array 30").

Regarding Claims 11 and 16: The rejections of claims 1 and 13 are incorporated

respectively; further Trimberger discloses signaling the presence of external processing

units (20-2n) to a central processing unit (10), and counting the number of available

external processing units based on said signaling (col. 14, lines 40-42 "object code is

optimized to fit the available configurable resources"; this necessarily requires the

claimed counting the number of available external processing units at any given point in

the execution).

Regarding Claim 13: The rejection of claim 12 is incorporated; further Trimberger

discloses connecting means for connecting at least one external processing unit (20-2n)

to which said repeated sub-sequence can be allocated (Fig. 1, 22).

Regarding Claim 14: The rejection of claim 13 is incorporated; further Trimberger

discloses a memory table (40) for storing an allocation information indicating an

allocation between said at least one external processing unit (20-2n) and corresponding

repeated sub-sequences (col. 7, line 66-col. 8, line 3 "The configuration store 31 may

[be] accessible ... for dynamically reprogramming in a field programmable gate array

30").

Regarding Claim 20: The rejection of claim 19 is incorporated; further Trimberger

discloses additional instruction is added so as to proceed said repeated sub-sequence

(col. 13, lines 30-33 "The programmed instruction is then executed upon detection of an

access to the start of the sequence in the cache, or the program can be re-compiled to

include the new programmed instruction").

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,752,035 to Trimberger (Trimberger).

Regarding Claims 3 and 23: The rejections of claims 1 and 18 are incorporated respectively; further Trimberger discloses ranking the execution frequency of instructions (col. 15, lines 39-44 "least used RISA instructions are converted back into fixed instructions")

Trimberger does not disclose this ranking comprises an integer number.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to indicate Trimberger's ranking (col. 15, lines 39-44 "least used RISA instructions") with an integer number set in proportion with the ranking. Those of ordinary skill in the art would have been motivated to do so in because of the ease of storage and manipulation (e.g. comparison) provided by the integer type.

Regarding Claim 4: The rejection of claim 3 is incorporated; further Trimberger discloses said allocation is determined by comparing said ranking with the number of available processing resources (20- 2n) (col. 15, lines 39-44 "until the used RISA instructions fit within the available configurable resources.").

Regarding Claim 5: The rejection of claim 4 is incorporated; further Trimberger

discloses all repeated sub-sequences for which said integer number is smaller than said

number of available processing resources are allocated to a selected processing

resource (col. 15, lines 39-44 "until the used RISA instructions fit within the available

configurable resources.").

Regarding Claim 6: The rejection of claim 1 is incorporated; further Trimberger

discloses determining the number of instructions in a repeated sub-sequence (col. 15,

lines 19-23 "commonly used sequences ... bounded by size").

Trimberger does not disclose including the information in said index information.

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to include the number of instructions in a repeated sub-sequence (col. 15,

lines 19-23 "sequences ... bounded by size") in said index information. Those of

ordinary skill in the art would have been motivated to do so in order to consolidate the

profiling information. Such a combination would be well within the ordinary level of skill

in the art and would have caused nothing but the expected results.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over US

5,752,035 to Trimberger (Trimberger) in view of Official Notice.

Regarding Claim 15: The rejection of claim 13 is incorporated; further Trimberger

discloses, wherein said apparatus is a processor (Fig. 1, 24) and said at least one

external processing units (20-2n) are processor cores and/or configurable logic blocks

(Fig. 1, 30).

Trimberger does not disclose the fixed processor is a DSP.

Official notice is taken that DSP's were known and used in the art at the time of

invention.

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to implement Trimberger's processor as a DSP. Those of ordinary skill in the

art would have been motivated to do so as a known means of implementing the

disclosed functionality (Fig. 1, Fixed E-UNIT 24).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

US 5,966,534 to Cooke et al.; US 6,077,315 to Greenbaum et al. and US

6,912,706 to Stamm et al. disclose various methods of program execution making use

of additional processing units.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Mitchell whose telephone number is (571) 272-3728. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bullock Lewis can be reached on (571) 272-3759. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Mitchell/
Jason Mitchell
9/30/8